Claims

1. A method for enhancing spread spectrum watermarking of digitized media, comprising:

receiving host data which is expressed in a transform domain by a plurality of host transform parameters;

reducing variance between the plurality of host transform parameters, thereby forming an enhanced sequence of host transform parameters; and

adding a watermark to the enhanced sequence of host transform parameters using a spread spectrum technique.

2. The method of Claim 1 wherein the step of reducing variance between the plurality of host transform parameters further comprises:

arranging the plurality of host transform parameters in at least one of an ascending order or descending order;

determining a difference for each pair of consecutive host transform parameters, thereby forming a plurality of difference values; and

alternating the sign of every other difference value in the plurality of difference values, thereby forming the enhanced sequence of host transform parameters.

3. The method of Claim 1 further comprises extracting perceptually significant host transform parameters from the plurality of host transform parameters prior to reducing variance, wherein the extracted host transform parameters serve as the basis for forming the enhanced sequence of host transform parameters.

4. The method of Claim 1 wherein the step of adding a watermark further comprises:

receiving watermark data which is expressed in a transform domain by a plurality of watermark transform parameters;

applying a pseudo random number sequence to the plurality of watermark transform parameters; and

combining the plurality of watermark transform parameters with the difference values in the enhanced sequence of host transform parameters, thereby deriving watermarked host data.

5. The method of Claim 1 wherein the host data is selected from a group consisting of audio data, image data, video data, software data, and multimedia data.

6. The method of Claim 1 wherein the transform domain is selected from a group consisting of fast fourier transform, discrete cosine transform (DCT), modulated discrete cosine transform, and discrete wavelet transform.

7. A method for enhancing spread spectrum watermarking of digitized media, comprising:

transforming host media data from a spatial domain to a frequency domain, thereby forming a plurality of host frequency coefficients indicative of the host data;

sorting the plurality of host frequency coefficients in at least one of an ascending order or a descending order;

determining a difference for each pair of consecutive host frequency coefficients, thereby forming a plurality of difference values;

alternating the sign of every other difference value in the plurality of difference values, thereby forming an enhanced sequence of frequency coefficients; and

adding a watermark to the enhanced sequence of frequency coefficients using a spread spectrum technique.

8. The method of Claim 7 wherein the host media data is segmented from the digitized media.

9. The method of Claim 7 wherein the host data is selected from a group consisting of audio data, image data, video data, software data, and multimedia data.

10. The method of Claim 7 wherein the step of transforming host media data further comprises using at least one of a fast fourier transform, a discrete cosine transform (DCT), a modulated discrete cosine transform, or a discrete wavelet transform.

11. The method of Claim 7 further comprises quantizing the plurality of frequency coefficients prior to the step of sorting.

12. The method of Claim 7 wherein the step of adding a watermark further comprises:

receiving watermark data which is expressed in a frequency domain by a plurality of watermark frequency coefficients;

applying a pseudo random number sequence to the plurality of watermark frequency coefficients; and

combining the plurality of watermark frequency coefficients with the enhanced sequence of frequency coefficients, thereby deriving watermarked host data.

13. A method for enhancing spread spectrum watermarking of media data, comprising:

receiving compressed media data;

decoding the compressed media data to recover a plurality of quantization indices indicative of the media data;

sorting the plurality of quantization indices in at least one of an ascending order or a descending order;

determining a difference for each pair of consecutive quantization indices, thereby forming a plurality of difference values;

alternating the sign of every other difference value in the plurality of difference values, thereby forming an enhanced sequence of quantization indices; and

adding a watermark to the enhanced sequence of quantization indices using a spread spectrum technique.